University of Genova

Department of Earth, Environmental and Life Sciences

Doctorate Course in Earth and Environmental Science and Technology

Earth Science Curriculum

Università degli Studi di Genova

SIAT

Dottorato in Scienze e Tecnologie per l'Ambiente e il Territorio

Research Theme n. 3

Titolo (Italiano) **Indagini sperimentali sulla fosfatizzazione di geomateriali carbonatici nella prospettiva di conservazione e restauro del patrimonio culturale e costruito** Title (inglese) **Experimental investigation on induced phosphatisation of $CaCO_3$ rich geomaterials for cultural or built heritage conservation**
Tutor (name and email) and eventual co-tutor Laura Gaggero (laura.gaggero@unige.it), Silvia Vicini (silvia.vicini@unige.it)
Program description including the formation program abroad (Inglese) Ongoing investigations on the conservation of carbonate dimension stones indicate that inducing the precipitation of an oxalate shield on the surface of the rock is a novel tool in preventive conservation or in restoration. However, the intrinsic critical properties of the geomaterial as fabric, grain size of rock forming minerals, primary and secondary porosity, and mineralogy, rule the success of the phosphatisation at the rock surface and the extent of its deepening into the rock volume. This interdisciplinary phD project aims at I) ex ante investigation of end member rock and mortar types, II) measuring all relevant properties controlling the reaction before and after the phosphatisation III) prioritising, also by a numerical approach, the driving factors in a number of CaCO3 rich geomaterials. Stages and scientific collaborations with foreign qualified laboratories (SUPSI, Switzerland, University of Salamanca, University of Zaragoza, Spain) is foreseen.
Financial support: DISTAV funds
Tutor's publications (max 3) 1. Scrivano S., Gaggero L., Gisbert Aguilar J. 2018 Micro-porosity and minero-petrographic features influences on decay: experimental from four dimension stones. Construction & Building Materials, 173, 342-349, doi: 10.1016/j.conbuildmat.2018.04.041. 2. Scrivano S., Gaggero L., Gisbert Aguilar J. 2019. An experimental investigation of the effects of grain size and pore network on the durability of Vicenza Stone, Rock Mechanics and Rock Engineering, 52/9, 2935-2948, doi:.org/10.1007/s00603-019-01768-x. 3. Castagnotto, E., Locardi, F., Slimani, S., Peddis, D., Gaggero, L., Ferretti, M. 2021 Characterization of the Caput Mortuum purple hematite pigment and synthesis of a modern analogue. Dyes and pigments, Vol.185, p.108881 doi: 10.1016/j.dyepig.2020.108881